Optical LAN Solution

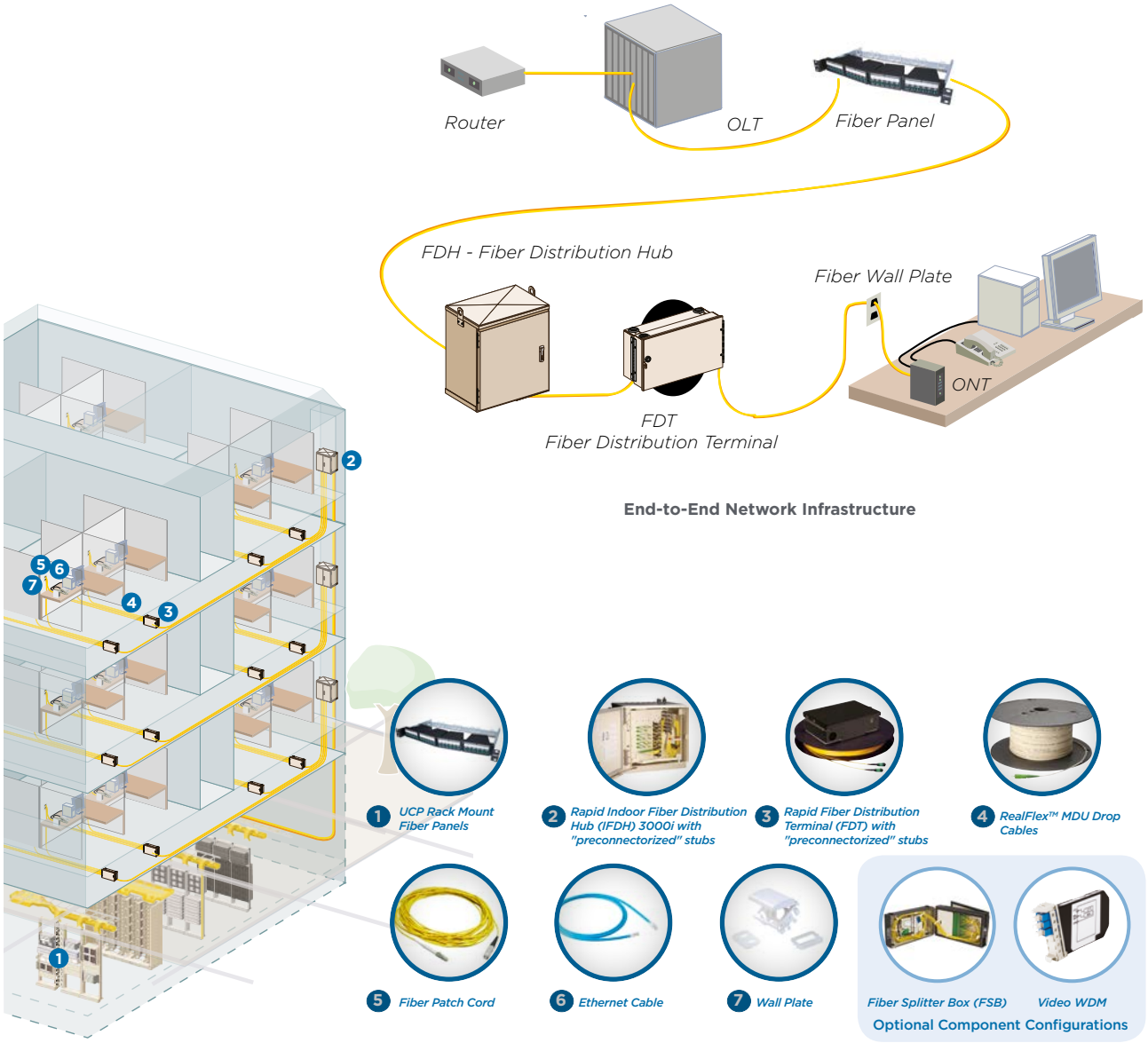
Simplifying Enterprise Passive Optical Networks (PON)
System Solution Guide EMEA

Optical LAN Solution

As optical fiber moves closer to end users, rapid changes are underway in both the data center and the equipment closet. As a result, new installation and maintenance techniques are being employed within enterprise applications. Passive Optical Network (PON) applications are now being deployed. Fiber is no longer limited to just access equipment. Fiber connectivity to a single user is a reality.

TE Connectivity offers complete, end-to-end PON infrastructure solutions called Optical LAN Solution (OLS). From the data center to the desktop, our customers have tapped the experience and innovation of TE to build their PON networks. TE's suite of end-to-end connectivity solutions is truly comprehensive. This ordering guide highlights the most commonly used components that feature field-proven attributes that can save time, money and help improve customer satisfaction.

The diagram below highlights an example of PON deployment using a TE OLS solution. Each number corresponds to a specific innovative TE product which is described in more details in this System Solution Guide.



End-to-End Network Infrastructure

OLS By the Numbers

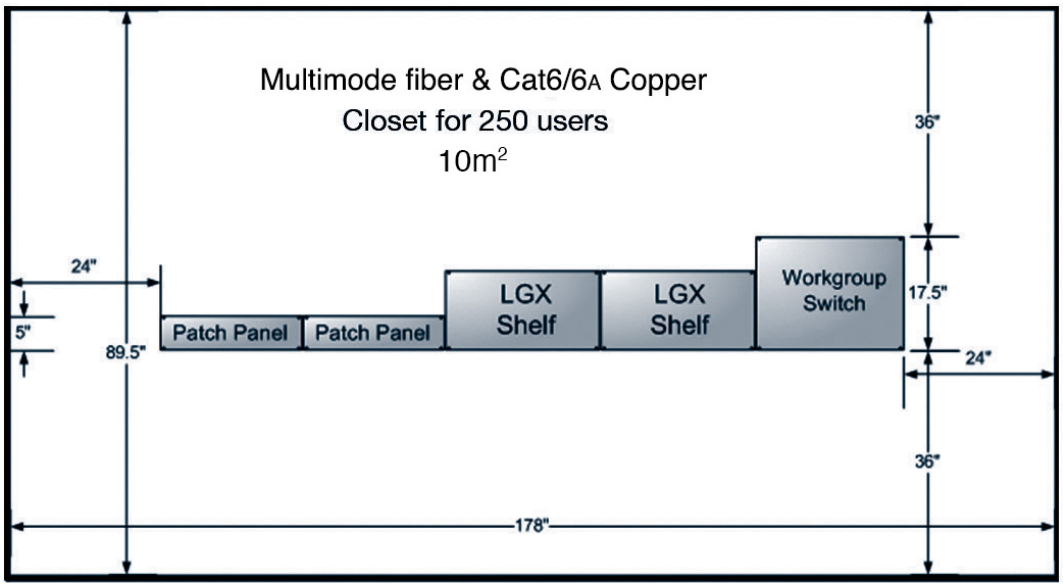
TE's Optical LAN Solution (OLS) is the end-to-end fiber optic infrastructure used for indoor Passive Optical Networks (PONs), that takes a single strand of singlemode graded fiber from the Data Center all the way to the individual desk or end device location.

This overview details some of the many features and benefits of Optical LAN Solution, highlighting the impressive numbers behind the OLS story.

The Environmental Impact of CAT6 (voice), Multimode fiber (backbone), and OLS (voice, data)

Traditional data/voice deployments require approximately 10m² in the IDF based on 250 users. Workgroup switches, fiber termination shelves, and patch panels require multiple racks that occupy valuable, and often expensive, floor space. The Hub and Terminal Optical LAN Solution eliminates these racks of equipment thus freeing up floor space to be reallocated for other value added, and in some cases revenue generating uses.

- Equipment is replaced by a single Fiber Distribution Hub (FDH) that can be wall mounted for significant space savings
- A wall mounted 72, 288, or even 432-user FDH requires just 1m² of space
- Aprox. 1m² vs. 10m² = On average more than 10x user density



Optical LAN Solution

Power and Environmental Savings

OLS vs. Traditional LAN Architectures

- Once the equipment energy consumption is totaled, the following formula can be used to calculate cost savings for commercial power between traditional copper/fiber and OLS:
  - Equipment wattage x 1.1 x 2/1000 = KW
  - KW x 8760 hrs per year = KWH
  - 0.107€ (European Average cost per KWH) = annual energy costs for the equipment

- Copper Solution example (700 users)
  - MDF has a router, servers, an analog gateway and a LAN switch
  - Each floor is equipped with multiple LAN switches and gateways

    Combined AMPS = 229
    Combined Watts = 82,368
    Combined BTU = 52,948

- OLS Solution example (700 users)
  - MDF has the same level 3 WAN router, an Optical Line Terminal (OLT), an edge router, and DC power distribution units
  - Each floor is equipped with low power consumption Optical Network Terminals (ONTs) at each user and all other equipment is passive

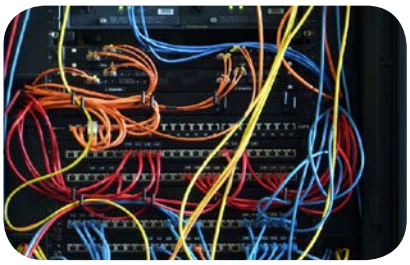
    Combined AMPS = 279
    Combined Watts = 24,088
    Combined BTU = 41,330

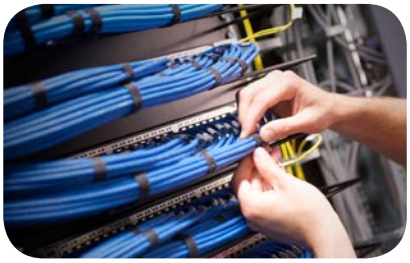
- The results – copper solution uses 50 AMPS less than OLS, however:
  - OLS saves 58,280 watts over copper solution (70%)
  - OLS saves 11,618 BTUs (22%)

    Annual energy cost for copper solution: **77,205€**
    Annual energy cost for OLS solution: **22,578€**
    Projected Savings: **54,627€ year-over-year savings**

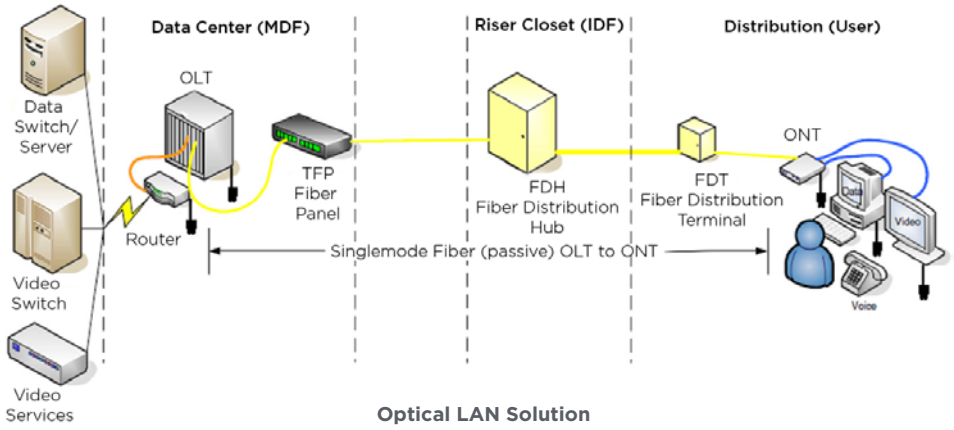
Operational Savings

OLS vs. Traditional LAN Architectures

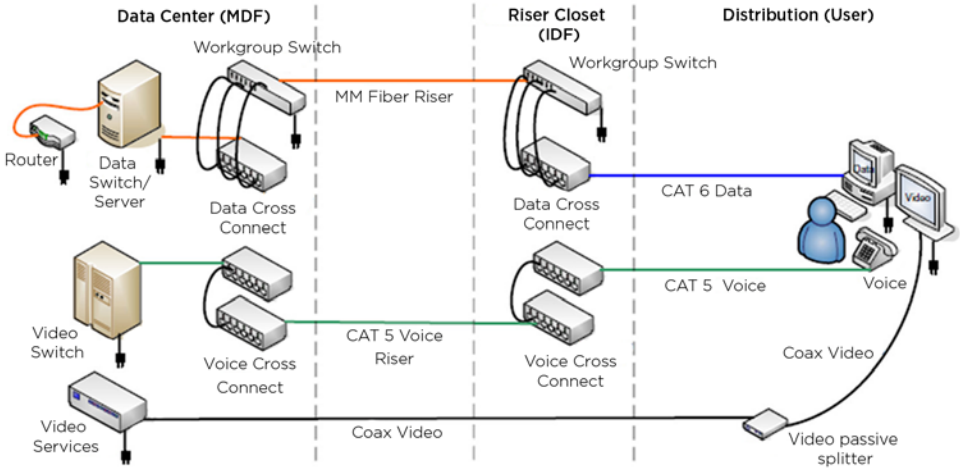




- Reduced Troubleshooting and Maintenance Costs
  - Traditional copper/fiber networks require up to three sets of electronics vs. OLS with only two, the OLT and ONT
- Reduced Maintenance Costs
  - OLS, being a fiber-only system, is inherently more reliable due to the resistance to electromagnetic interference (EMI) and radio frequency interference (RFI) and crosstalk
- Reduced Installation Costs
  - OLS offers plug-and-play installation, no splicing or field termination
  - Fiber offers greater tensile/pull strength (100-200 lbf.) as compared to copper UTP (25 lbf.)
  - OLS incorporates bend insensitive singlemode fiber for greater installation flexibility
- Reduced Life Cycle Costs – Optical LANs have a longer usable lifetime because currently the bandwidth limitation of traditional singlemode fiber is not known. Because of this, the network electronics can be upgraded to the next generation to increase data without pulling new cable



Optical LAN Solution



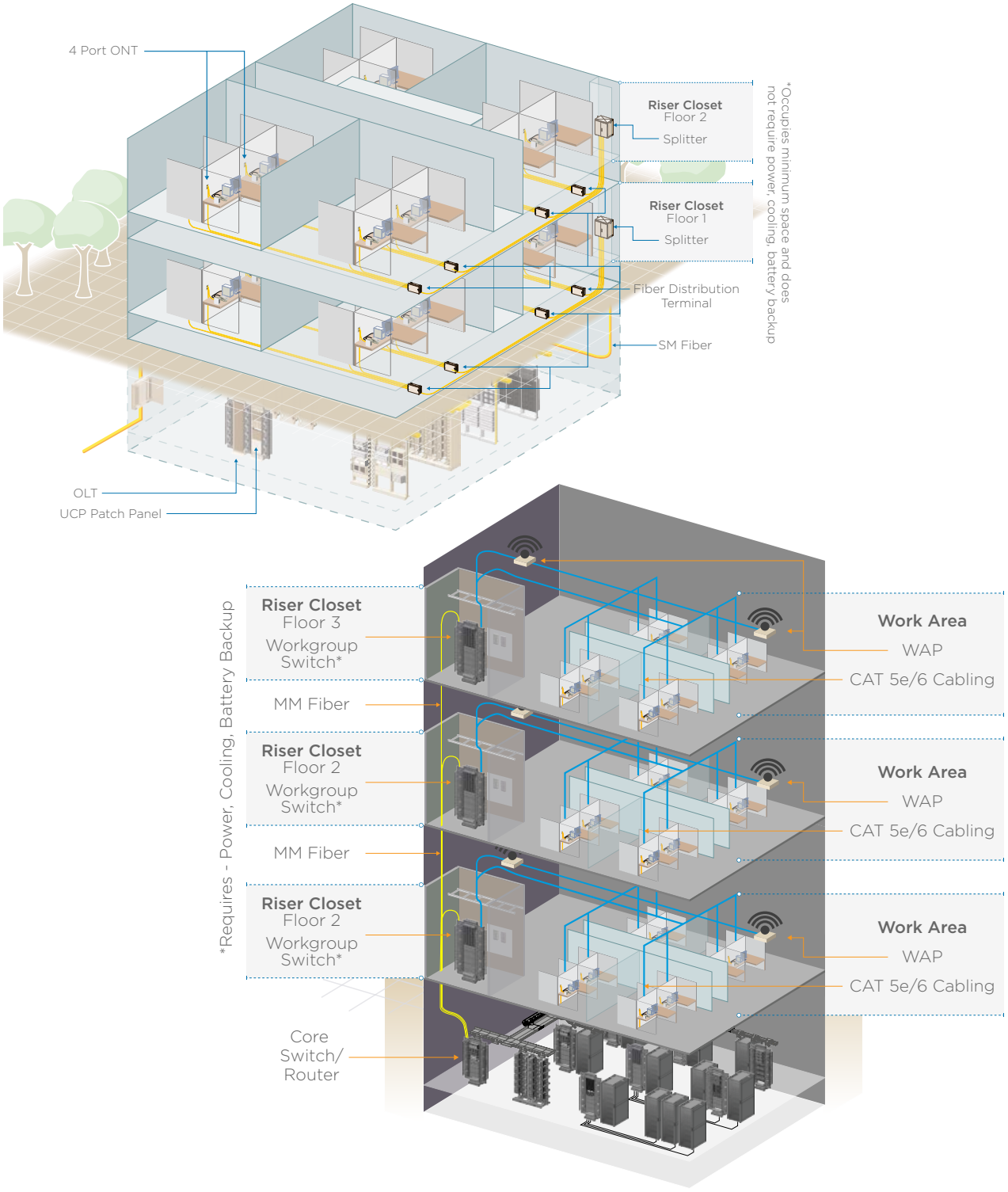
Traditional Architecture

Optical LAN Solution

Cable Plant Savings

Contrasting the Environmental Impact of CAT6 / CAT6A (horizontal), multimode fiber (vertical), and TE Optical LAN Solution (OLS)

The environmental impact of choosing OLS over traditional structure cabling architectures can be significant. The following scenario compares the environmental impact and cable costs reduction of traditional CAT6 / CAT6A and multimode fiber versus OLS. The analysis is based on the same scenario found on page 4 using 700 users model.



- Cable weight for 12 core multimode fiber (MMF) cables for vertical backbone up to 60 meters: **18 kg**
- Cable weight of horizontal cabling for 1400 CAT6 & CAT6A outlets (2 ports per user) 55 metre average run:
  CAT6A Shielded: **2800 kg**
  CAT6 Unshielded: **2660 kg**
- Total cable weight for MMF and Shielded CAT6A: **2818 kg**
- Total cable weight for MMF and Unshielded CAT6: **2678 kg**

- Cable weight for single mode (OS2) bend insensitive fibre to support 350 ONTs (2 ports per user) – 70 metre run* - Converged voice – data – video: **221 kg**
- Total cable weight OLS: **221 kg**

(*) 70 metres takes into consideration the vertical and horizontal runs combined

- **Total weight savings for 700 users: 2597 kg vs Shielded CAT6A**
- **Total weight savings for 700 users: 2457 kg vs. Unshielded CAT6**

Cable Cost Saving per User:

TRADITIONAL COPPER & FIBRE	
CAT6 Unshielded (UTP) horizontal cable run of 55 metre	= 23.10€ x 2 (ports) = 46.20€
Multimode Fibre OM4 vertical backbone (shared uplink access to aggregation)	= 1.93€
Total cost	= 48.13€

OPTICAL LAN SOLUTION (OLS)	
Single Mode OS2 Bend Insensitive cable run of 70 meter (each fiber run supports a 4 port ONT - 2 users)	= 24.50€ / 2 = 12.25€
Total cost	= 12.25€

TOTAL CABLE COST SAVINGS PER USER	**= 35.88€**
TOTAL CABLE COST SAVINGS FOR 700 USERS	**= 25,116€**

Please contact TE Connectivity for a customised in depth comparison, our expert personnel will be glad to assist and provide a comprehensive anaylys to demonstrate to actual cost savings on a case by case basis.

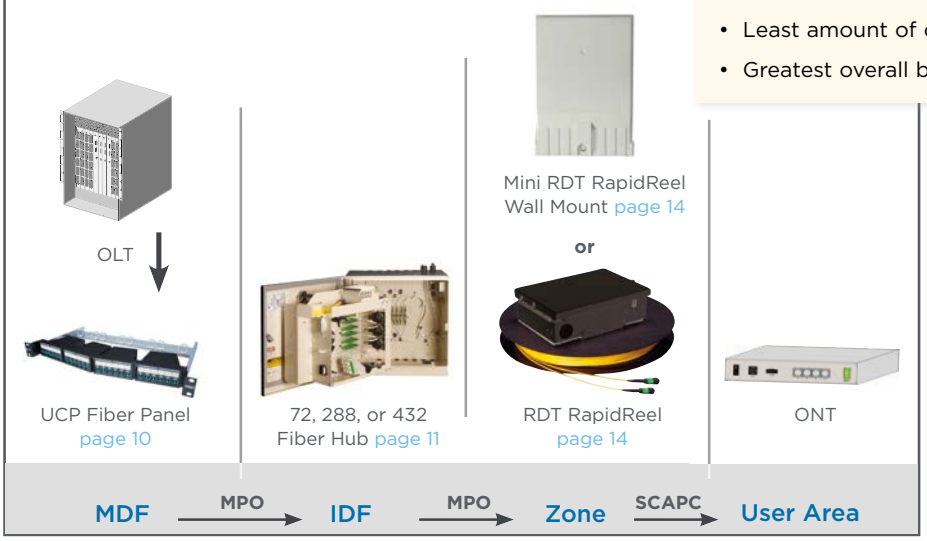
Optical LAN Solution

Architectural Design Options

Just like traditional point-to-point networks, Passive Optical Networks (PON) can be varied depending upon network needs, architecture, building layout, and economics. TE offers a designer the widest variety of cabling solutions available for Passive Optical Networks. The following potential network designs are shown as guidelines for PON applications. They may be used alone, or in combination when added to the appropriate PON electronics. TE always suggests that a systems integrator be involved when designing a PON architecture to ensure the optimum performance of the network electronics and the optical network.

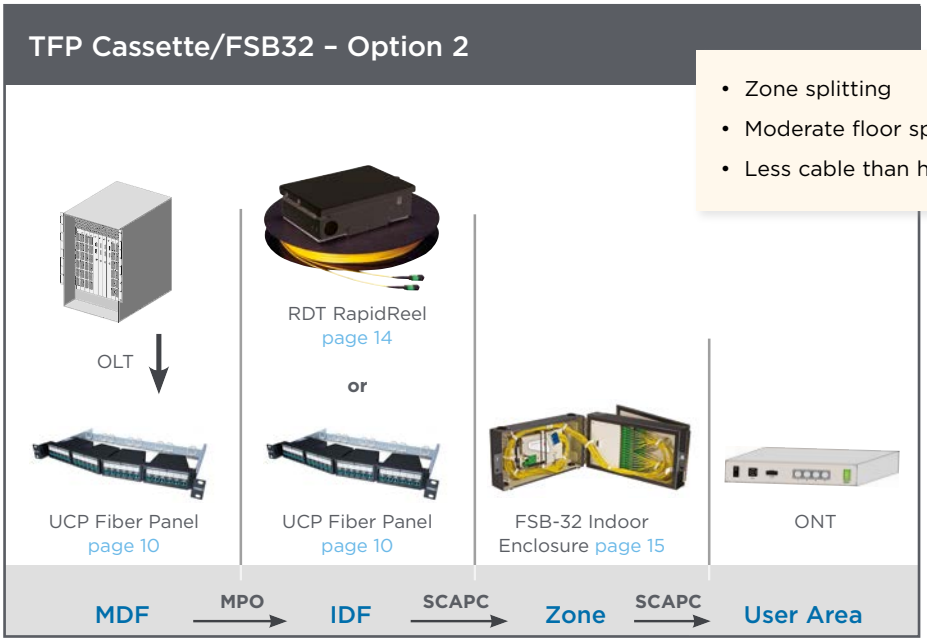
FDH/FDT Rapid Reel Solution – Option 1

- Least amount of floor space
- Least amount of cable
- Greatest overall building savings

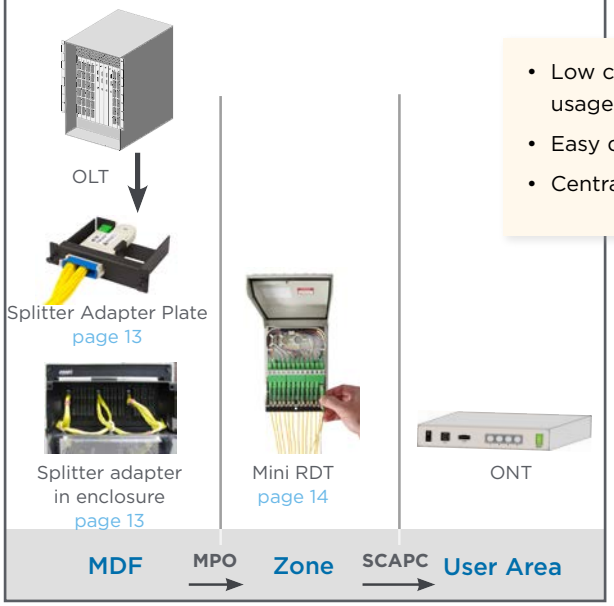


TFP Cassette/FSB32 – Option 2

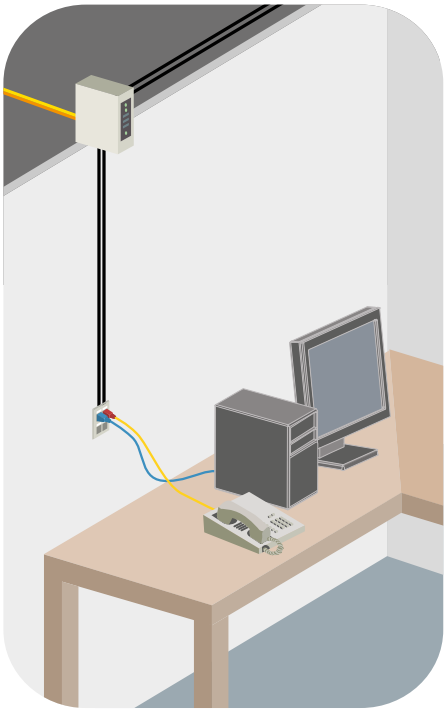
- Zone splitting
- Moderate floor space
- Less cable than home run solution



Centralized Splitting – Option 3

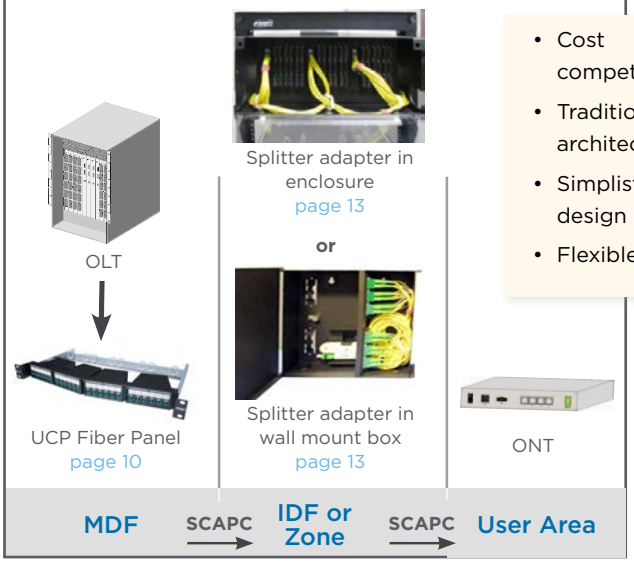


- Low cable usage
- Easy design
- Central Splitting



ONTs can also be located in a consolidation area in the IDF zone or by means of an enclosure or in-ceiling tile as shown in the images below.

Splitter Adapter Plate – Option 4



- Cost competitive
- Traditional LAN architecture
- Simplistic design
- Flexible

UCP Patch Panel Angled and Flushmount

FEATURES

- 19" 1U unloaded modular patch panel with support for 4 Quick-Fit Modules
- Angled and flush style panels available
- Modular, rear cable management for both horizontal Copper and Fiber cables
- Accepts Pre-terminated Cu or FO cassettes or Field-terminated Copper modules
- Including grounding bolt

Color: black (RAL 9005)

ORDERING INFORMATION

Description	Part Number
UCP Patch Panel 1U Angled	1-1671590-1
UCP Patch Panel 1U Flush	1-1671594-1

Xtra-U Subfloor Panel Holder Kit

FEATURES

- Suitable for Copper and Fiber installations
- Allows up to 630mm gap between support pillars
- Available for 1, 2 or 4U
- Bracket set to install 19" panels in the false floor area underneath cabinets/racks
- Attachable to support pillars with round or square cross-section (diameters from 14 to 30mm)

Color: galvanized

ORDERING INFORMATION

Description	Part Number
Xtra-U Subfloor Panel Holder Kit 1U	1671189-1
Xtra-U Subfloor Panel Holder Kit 2U	1671189-2
Xtra-U Subfloor Panel Holder Kit 4U	1671189-4

Xtra-U Aerial Panel Holder Kit for Wire Mesh Cable Trays

FEATURES

- Universal bracket for installing 19"patch panels above cabinets /racks
- Can be attached to wire mesh cable trays
- 2U and 4U version available

UCP COMPATIBLE

Color: galvanized

ORDERING INFORMATION

Description	Part Number
Xtra-U Aerial Panel Holder Kit (2U) for Wire Mesh Trays	1-1671603-1
Xtra-U Aerial Panel Holder Kit (4U) for Wire Mesh Trays	1-1671603-2

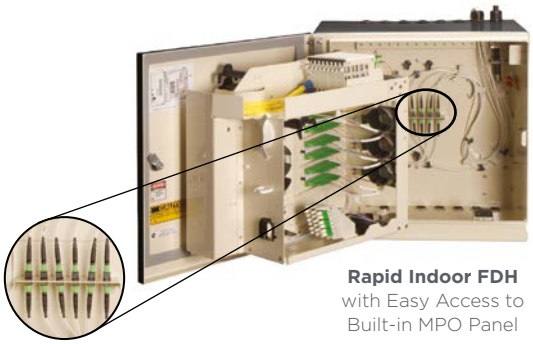
Rapid Fiber Distribution Hub (iFDH)

TE's Rapid Fiber Distribution Hub organizes and administers optical fiber cables and passive optical splitters for enterprise PON applications. The enclosures support plug-and-play termination with a cross-connect/interconnect interface that makes installation, maintenance, and changes faster and easier. The RapidReel feeder cable speeds up installation time and conveniently stores slack inside the iFDH.

Rapid Indoor FDH front panel

FEATURES

- Supports plug-and-play termination
- Can be either wall or rack mounted with the hardware provided
- Traditional swing-frame design allows superior rear access
- Includes RapidReel feeder cable
- Designed to meet NEMA-12 requirements
- UL 1863 Listed



Rapid Indoor FDH with Easy Access to Built-in MPO Panel

ORDERING INFORMATION

Description	Feeder Cable Type	Distribution Type	Feeder Stub Length	Part Number
72-Port with 9 splitter ports	12-fiber plenum	6 MPO adapters	100'	OLH-MK072J00M0MKCA
			250'	OLH-MK072J00M0MKEA
			500'	OLH-MK072J00M0MKBA
72-Port Empty Hub	No feeder cable**			OLH-MK072J00M0M000
288-Port with 18 splitter ports	24-fiber plenum	24 MPO adapters	100'	OLH-MM288J00M0MKCB
			250'	OLH-MM288J00M0MKEB
			500'	OLH-MM288J00M0MKBB
288-Port Empty Hub	No feeder cable**			OLH-MM288J00M0M000
432-Port with 22 splitter ports	24-fiber plenum	36 MPO adapters	100'	OLH-MN432J00M0MKCB
			250'	OLH-MN432J00M0MKEB
			500'	OLH-MN432J00M0MKBB
432-Port Empty Hub	No feeder cable**			OLH-MN432J00M0M000

*Note: Splitters are purchased separately; ordering information on the following page.

Mini Plug-and-Play Splitter Modules

TE's Mini Plug-and-Play Splitter Modules support centralized splitting architectures. The modules are available in a wide range of split ratios. The rugged packaging is built for high performance, while the true plug-and-play design reduces installation time.

Plug and Play splitter

FMT Rack Mounted Splitter Panel

FEATURES

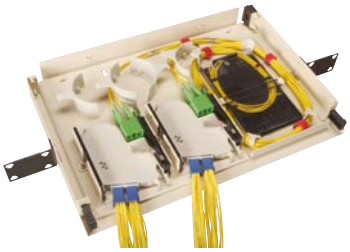
- Bend-optimized fiber and ruggedized extreme temperature cabling
- Operating temperature range -55° to +85° C
- Wavelength range of 1260-1635 nm
- Easy to insert and remove without affecting adjacent splitters
- UL 1863 Listed

SPECIFICATIONS:

Splitter Type	Max Loss	Typical Loss	Uniformity	Return Loss	Directivity	PDL	Wavelength Range
1x16	13.5 dB	12.8 dB	1.0 dB	55 dB	60 dB	0.3 dB	1260-1635 nm
1x32	16.7 dB	16.0 dB	1.3 dB	55 dB	60 dB	0.3 dB	1260-1635 nm

ORDERING INFORMATION

Description		Part Number
Mini Plug-and-Play Splitter Angled SC Pigtails, Used with iFDH, FSB, Splitter Drawer, and Splitter Panels	1 x 32 splitter	OLS-MPP13266
	1 x 16 splitter	OLS-MPP11666
	1 x 8 splitter	OLS-MPP10866
	2 x 16 splitter	OLS-MPP1P66
	2 x 32 WDM Splitter	OLS-MPP1E66
	2 x 32 splitter	OLS-MPP12A66
1RU FMT Rack Mount Splitter with Splitter	1 x 32 splitter	OPS-FMTSP-AJJ01
	2 x 32 splitter	OPS-FMTSP-GJJ01
1 RU Rack Mount Splitter Drawer Accommodates up to 4 mini Plug-and-Play Splitters (purchased separately)		OPS-MPPACCRMPNL



1RU Rack Mount Splitter Drawer

Splitter Adapter Plate

The splitter adapter plate offers Passive Optical LAN designers a cost-effective method to split optical signals to multiple locations/users using traditional cabling and enclosure footprints. Reduced bend radius fiber technology enables technicians to route fiber in the cabinet in less time, saving installation costs. The splitter adapter plate supports centralized splitting architectures and can be used in a wide range of TE cabinets, enclosures, wall mount boxes, and floor mount boxes. The rugged packaging is built for high performance while its plug-and-play design helps reduce installation time.

KEY FEATURES & BENEFITS:

- Bend-optimized and rugged fiber
- Extreme temperature cabling (Operating temperature: -55°C to +85°C)
- Superior loss performance at 1310nm to 1490nm and 1550nm
- Meets requirements of GR-1209 and GR-1221
- Optional front side input connection
- Terminated with SC/APC connectors
- 54 inch cable length

SPECIFICATIONS:

Splitter Type	Max Loss	Typical Loss	Uniformity	Return Loss	Directivity	PDL	Wavelength Range
1x16	13.5 dB	12.8 dB	1.0 dB	55 dB	60 dB	0.3 dB	1260-1635 nm
1x32	16.7 dB	16.0 dB	1.3 dB	55 dB	60 dB	0.3 dB	1260-1635 nm

ORDERING INFORMATION

Description	Part Number
Splitter Adapter Plate	
1 x 32 Splitter Adapter Plate with splitter	2111684-1
1 x 16 Splitter Adapter Plate with splitter	2111684-2
Front input kit (cable assembly and adapter)	2111699-1
96 Fiber output, 3 Fiber input, Rack Mount Enclosure	
4RU Enclosure (1 pc)	559552-2
12 SC/APC Adapter Plate (9 pcs)	559596-3
Splitter Adapter Plate (3 pcs)	2111684-1
Optional SC/APC MPO Cassette	1918447-1
96 Fiber output, 3 Fiber input, Rack Mount Panels	
1RU Rack Mount Panel (4 pcs)	1777125-1
12 SC/APC Adapter Plate (9 pcs)	559596-3
Splitter Adapter Plate(3 pcs)	2111684-1
Optional SC/APC MPO Cassette	1918447-1
32 Fiber Wall Mount Box	
Double Sided, Single Door Wall Mount Box	1435128-1
12F SC/APC Adapter Plate (3 pcs)	559596-3
Splitter Adapter Plate (1 pc)	2111684-1

Rapid Fiber Distribution Terminal

TE's Rapid Fiber Distribution Terminal (FDT) provides a compact, NEMA-12 rated solution for connecting optical fiber cables within enterprise environments and serves as a distribution/consolidation point. It eliminates the need for splice cases and separate cable assemblies by integrating the RapidReel cable payout system. Use of factory terminated and tested MPO connectors instead of splicing provide a plug-and-play environment that reduces labor costs and speeds project completion. The Rapid FDT provides a lockable consolidation point and localized patch field, allowing for precise cable length customization in the field, while reducing overall cable volume and simplifying routing from the FDH to the user area. The iFDT's compact footprint enables it to be placed under raised floors, above ceilings, or wall mounted.

Rapid FDT

Rapid FDT
using slider adapter packs

FEATURES

- Built-in RapidReel technology allows for easy payoff of MPO stub
- Patented break-away spool flanges reduce slack storage size to within the enclosures footprint
- Utilizes reduced bend radius fiber
- UL 1863 listed

ORDERING INFORMATION

Description	Stub	Feeder Stub Length	Part Number
Rapid FDT 12-fiber Loose tube cable	MPO	100'	OLR-SJ12J00D1002A
		200'	OLR-SJ12J00D2002A
		300'	OLR-SJ12J00D3002A
Rapid FDT 24-fiber Loose tube cable		100'	OLR-SJ24J00D1002A
		200'	OLR-SJ24J00D2002A
		300'	OLR-SJ24J00D3002A
		500'	OLR-SJ24J00D5002A
Mini-RDT 12-fiber : Lengths over 100 ft use external reel	MPO	100'	ODT-SM12J00D03090
		200'	ODT-SM12J00D0619A
		300'	ODT-SM12J00D0929A
		400'	ODT-SM12J00D1229A
		500'	ODT-SM12J00D1529A

*Note: Other cable lengths available. Contact your local TE sales engineer.

Mini RDT
12 Fiber

Mini RDT and Spool

Mini RDT Open and Pulling Rapid

Fiber Splitter Boxes

FSB-32 Indoor Enclosure

TE's Fiber Splitter Boxes (FSB) are mini Fiber Distribution Hubs that can be used for plug-and-play (PNP) or fusion splice applications.

When used as a plug-and-play box, they are ideal for uses such as lower count floors or buildings, extra capacity requirements beyond the standard Fiber Distribution Hub (FDH), and when localized splitting or physical path redundancy (using a 2x32 split) is desired.

The same box can also be used to extend services beyond the primary building to other smaller buildings with limited users on the campus. In this type of application, the FSB is typically spliced to the OSP fiber cable connecting the buildings and would offer the optical splitting required to provide PON services to the second building.

These wall boxes provide a small footprint for splitting, terminating, and splicing. FSBs accept standard plug-and-play splitters and can be easily added after the wall box has been installed. FSBs accommodate 1x8, 1x16, 1x32, 2x16 and 2x32 splitters. Wall mounting provides significant space savings and the unique swing frame design allows for easy access to the back section of the wall box.

FEATURES AND BENEFITS

- Dual hinge design creates separation between rear splitter section and front patching access
- Splitters can be easily installed after wall box installation allowing for separate purchase
- Provides up to 32 customer access ports per splitter
  - Dual hinge provides small footprint on the wall while maintaining excellent hand access to connectors
- Accepts standard mini-PNP splitter modules (same as iFDH)
- UL 1863 Listed

ORDERING INFORMATION

Description		Part Number
FSB-32 Indoor Enclosure; with SC/APC adapters, 32-fiber distribution	No splitters, no splice trays	OSB-SBJ032000000
	No splitters, with heat shrink splice trays	OSB-SBJ232000000
	(1) 1x32 splitter installed, no splice trays	OSB-SBJ032A10000
	(1) 1x32 splitter installed, with heat shrink splice trays	OSB-SBJ232A10000
	2 x 32 splitter installed, no splice trays	OSB-SBJ032G10000
	2 x 32 splitter installed, with heat shrink splice trays	OSB-SBJ232G10000
Optical Splitter Module - Angled SC Pigtails	1x32 splitter	OLS-MPP13266
	1x16 splitter	OLS-MPP11666
	1x8 splitter	OLS-MPP10866
	2x16 splitter	OLS-MPP1P66
	2x32 splitter	OLS-MPP12A66

Optical Fiber Cables

The TE reduced bend radius singlemode cable assemblies are used to connect the user area to the Rapid FDT or when connecting the ONT to the wall plate at the user end of the PON. With nearly 40 years of fiber cable manufacturing experience,
TE offers a complete family of high performance cable and related products.

SC Angled Polish

SC Ultra Polish

TE's singlemode reduced bend radius cable assemblies have a bend radius of 7.5 mm and are backwards compatible with standard singlemode fiber. TE offers ultra physical contact (UPC) or angled physical contact (APC) SC connector styles. TE maintains tight tolerances regarding the geometry and concentricity of the ferrule to maintain low insertion loss values. All cable assemblies undergo stringent testing for both insertion loss and return loss at the factory before shipment which ensures a high quality product is delivered.

SC Simplex Drop Cable

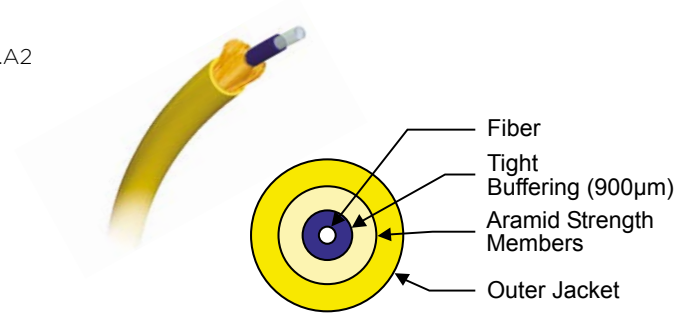
ORDERING INFORMATION

Description	Part Number
SC/APC-SC/APC Simplex Drop Cable G.657-A.2, yellow	Y-2160593-X
SC/APC-SC/UPC Simplex Drop Cable G.657-A.2, yellow	Y-2160594-X

Y- -X	Length	Y- -X	Length	Y- -X	Length	Y- -X	Length	Y- -X	Length	Y- -X	Length
0- -1	1 m	0- -5	5 m	2- -5	25 m	4- -5	45 m	6- -5	65 m	8- -5	85 m
0- -2	2 m	1- -0	10 m	3- -0	30 m	5- -0	50 m	7- -0	70 m	9- -0	90 m
0- -3	3 m	1- -5	15 m	3- -5	35 m	5- -5	55 m	7- -5	75 m	9- -5	95 m
0 -4	4 m	2- -0	20 m	4- -0	40 m	6- -0	60 m	8- -0	80 m		

OS2 Singlemode Optical Fiber Interconnect Cable

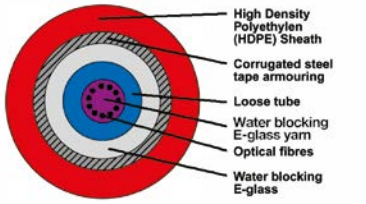
- Outer jacket color: yellow
- All fiber is bend-insenstive ITU-T G657.A2



ORDERING INFORMATION

Cable Type/Jacket Diameter	Fiber Count	Unit Count Units (Fibers/Unit)	LSZH
Simplex (2.0 mm)	1	1 (1)	4-1702690-6

External Rodent Resistant Loose Tube System Cable with corrugated steel armour



FEATURES

- LLDPE (Linear Low Density Polyethylene)
- Metallic rodent resistant (corrugated steel)
- For use in ducts and in direct burial applications
- Longitudinal and lateral water resistance
- Central gel-filled loose tube construction
- Excellent crush and impact resistance
- Suitable for all termination techniques
- Fiber category: OS2
- Option: ULSZH sheath for internal and external applications

ORDERING INFORMATION

Description	Part Number
Fiber count: 4	Y-599681-4
Fiber count: 6	Y-599682-4
Fiber count: 8	Y-599692-4
Fiber count: 12	Y-599683-4
Fiber count: 24	Y-599690-4

Y-	Reel size
1-	1 Kilometer
2-	2 Kilometer
3-	3 Kilometer
4-	4 Kilometer

MECHANICAL PERFORMANCE

Fiber count	No. of tubes/fillers	Overall Ø (mm)	Weight (kg/km)	Installation tension max. during installation (N)	Crush resistance (N)	Minimum bend radius during installation (mm)
4, 6, 8, 12	1	10	104	1250	3000	200
24	1	10.5	120	1250	3000	200

TEMPERATURE RANGE

Cable type	Transport/Storage	Installation	Operation
Gel filled, loose tube	– 20 to + 70 °C	– 5 to + 50 °C	– 20 to + 70 °C

Category 6_A LSZH UTP and S/FTP Patch Cords

FEATURES

- Supports 10 Gigabit Ethernet to a full 100m
- Exceeds the requirements of IEEE 802.3an (10GBASE-T) and ISO/IEC 11801:2002 amendment/channel requirements
- Superior cable flexibility from stranded cores
- Boot maintains correct bend radius to ensure maximum performance

ORDERING INFORMATION

Description	Cable Color	Cable Type	Part Number
Augmented Category 6 LSZH Patch Cord RJ45 plug to RJ45 plug, T568B	Blue	LSZH UTP	6645 2 827-XX
	Blue	LSZH S/FTP	6830 2 881-XX
	Red	LSZH S/FTP	6830 2 882-XX
	Yellow	LSZH S/FTP	6830 2 883-XX
	Green	LSZH S/FTP	6830 2 884-XX
	Orange	LSZH S/FTP	6830 2 885-XX
	Grey	LSZH S/FTP	6830 2 887-XX

-XX	Length
-04	1.0 m
-07	2.0 m
-10	3.0 m
-15	5.0 m
-25	7.5 m
-33	10 m

Other colors and lengths are available upon request.

Category 6_A S/FTP Patch Cord RJ-45 LSZH

FEATURES

- Category 7 S/FTP stranded cable
- LSZH sheath
- Color-matched snagless boots

ORDERING INFORMATION

Description	Part Number
Color: white	Y-1711815-X
Color: blue	Y-1711816-X
Color: gray	Y-1711817-X
Color: yellow	Y-1711818-X
Color: red	Y-1711819-X
Color: green	Y-1711820-X

Y- -X	Length
1- -1	0.5 m
0- -1	1.0 m
0- -2	2.0 m
0- -3	3.0 m
0- -5	5.0 m
1- -0	10.0 m

Other colors and lengths are available upon request.

Category 6 S/FTP Patch Cord RJ-45 LSZH

FEATURES

- Category 7 S/FTP stranded cable
- LSZH sheath
- Color-matched snagless boots
- Universal B-wiring

ORDERING INFORMATION

Description	Part Number
Color: white	Y-959385-X
Color: gray	Y-1711076-X
Color: green	Y-1711077-X
Color: yellow	Y-1711078-X
Color: blue	Y-1711079-X

Other colors and lengths are available upon request.

Category 6 U/UTP Patch Cord RJ-45 LSZH

FEATURES

- Category 6 according to ISO/IEC 11801 and EN-50173-1
- 4 Pair stranded U/UTP cable
- LSZH sheath
- Color-matched snagless boots
- Universal wiring

ORDERING INFORMATION

Description	Part Number
Color: white	Y-1711091-X
Color: gray	Y-1711093-X
Color: blue	Y-1711094-X
Color: green	Y-1711095-X
Color: red	Y-1711096-X

Y- -X	Length
1- -1	0.5 m
0- -1	1.0 m
0- -2	2.0 m
0- -3	3.0 m
0- -5	5.0 m
1- -0	10.0 m

Other colors and lengths are available upon request.

Optical LAN Solution

MiniPods

FEATURES

- External mounting points
- Can be passed through standard floor grommets
- Incorporated dust protection on each port
- Pre-loaded with modular connectivity (including CL jacks)
- 3, 4 and 6 port versions available

ORDERING INFORMATION

Description	Part Number
MiniPod Cat. 6 CL UTP 3 port	6540 1 684-03
MiniPod Cat. 6 CL UTP 4port	6540 1 678-04
MiniPod Cat. 6 CL UTP 6 port	6540 1 678-06

AMP-TWIST 6$_A$S Consolidation Point Transition Cable Assemblies

FEATURES

- Assembly to connect the work area outlet with the consolidation or transition point
- Saves time and money on moves, adds and changes
- According to ISO/IEC 11801
- Category 7 F/FTP solid cable according to IEC 61156-5 and EN 50288-4-1
- LSZH sheath
- Universal wiring

Color: white

Y- -X	Length
0- -5	5.0 m
1- -4	7.5 m
1- -0	10.0 m
1- -5	15.0 m
2- -0	20.0 m
3- -0	30.0 m

ORDERING INFORMATION

Description	Part Number
AMP-TWIST 6$_A$S SL jack w/o dust cover to RJ-45 plug; Class E$_A$	Y-1711825-X
AMP-TWIST 6$_A$S SL jack with dust cover to RJ-45 plug; Class E$_A$	Y-1711851-X

Unshielded Consolidation Point Transition Cable Assemblies

FEATURES

- Assembly to connect the work area outlet with the consolidation or transition point (SL 110C Jack to modular plug)
- Meets ISO/IEC 11801 and EN 50173-1
- 4 pair solid U/UTP cable
- LSZH sheath
- Universal wiring

Color: white

Y- -X	Length
0- -5	5.0 m
1- -4	7.5 m
1- -0	10.0 m
1- -5	15.0 m
2- -0	20.0 m

ORDERING INFORMATION

Description	Part Number
Cat. 6; Class E	Y-1711027-X

Wall Mount Enclosure for 6 Modules, Unloaded, with Side Door

FEATURES

- Accepts 6 Snap-In-Modules (Snap-In Modules)
- Optional lock available (559501-2)
- Optional grommets available
- Splice tray holder kit available
- Designed for intrabuilding or campus backbone applications
- Reversible cable strain relief bracket
- Recessed, easy-to-use door latches
- Dimensions (for exact dimensions consult customer drawing): 16.5" (40 cm) H x 14" (35.5 cm) D x 5" (13 cm) W

Color: black (RAL 9005)

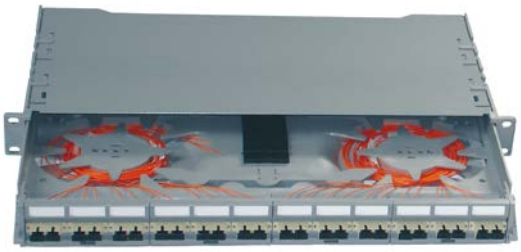
ORDERING INFORMATION

Description	Part Number
With grommets, cable glands and splice tray holder	1278755-4
Splice tray holder kit	1374526-1
Grommets	559496-2
Lock	559501-2

Fiber Optic 1U Plastic Fiber Patch Panel

FEATURES

- 1U sliding panel for ease of access and standard deployment into 19 inch racks
- Internal cable management protects splices and pigtails and maintains bend radius
- A PC-ABS construction means that the tray is both lightweight whilst retaining mechanical strength
- UL94V -0 flammability rating, allows usage within a building



ORDERING INFORMATION

Description	Color	Adaptor	Fiber type	Part Number
Fiber patch panel 12 port	grey	6 x SC Duplex	singlemode	7033 1 101-12
Fiber patch panel 24 port	grey	12 x SC Duplex	singlemode	7033 1 101-24

Wall Mount Enclosure 2F/4F (Plastic)

FEATURES

- Pre-installed adapter
- Size: 125 x 150 x 65 mm (W x H x D)
- IP 53 rated

ORDERING INFORMATION

Description	Part Number
Wall Mount Enclosure 2F, 1 x SC Duplex, SM	1671116-2

Wall Mount Enclosure 6F/12F (Plastic)

FEATURES

- Pre-installed adapters
- Incl. management ring
- Size: 225 x 280 x 85 mm (W x H x D)
- IP 53 rated

ORDERING INFORMATION

Description	Part Number
Wall Mount Enclosure 6F, 1 x SC Duplex, SM	1671117-2

Wall Mount Enclosure 12F/24F (Plastic)

FEATURES

- Pre-installed adapters
- Incl. management ring
- Supplied without splicing tray
- Size: 220 x 325 x 110 mm (W x H x D)
- IP 53 rated

ORDERING INFORMATION

Description	Part Number
Wall Mount Enclosure 12F, 1 x SC Duplex, SM	1671118-2
Wall Mount Enclosure 24F, 1 x SC Duplex, SM	1-1671118-2

Universal Fiber Optic wall outlets

FEATURES

- Unpopulated wall outlets for all Fiber-to-the-Desk applications (Inserts to be ordered separately)

Color: pure white (RAL 9010)

ORDERING INFORMATION

Description	Part Number
"45x45" Outlet 45 x 45 mm for SC-Duplex adaptor; Color: white (RAL 9010)	183931-1
DIN Outlet for SC Duplex Adaptor; Frame: No; Color: almond (RAL 1013)	966936-2
DIN Outlet for SC Duplex Adaptor; Frame: No; Color: white (RAL 9010)	2-966936-2
Fiber coupler duplex SC/APC with ceramic ferrule; Color: green	2-5502776-3
Blank adapter module; Color: white	1116412-3

Fiber Optic Wall Outlet

FEATURES

- Designed for modern small-form-factor deployments and into legacy Gigabit Ethernet deployments.
- Integrated cable management allows diverse routing for excess spool management and maintenance of bend radius whilst the Fiber optic cable is housed in the solution.
- The footprint suits standard (BS4660) electrical wall back boxes for deployment in trunking and walls.
- Designed to allow the insertion of heat shrink splice protection holders giving the flexibility to choose between direct termination and splicing.
- Anchor points allow the Fiber optic cable to be tied-off at the point of entry into the base which prevents the cable from slipping back into a wall recess during installation.
- Per port labelling provides easy identification of each subscriber network link.

ORDERING INFORMATION

Description	Part Number
1 x SC duplex outlet	7033106902
2 x SC duplex outlet	7033106904

Optical LAN Solution

AMP LightCrimp Plus Connectors

FEATURES

- Easiest and quickest fiber termination (less than one minute)
- Factory polished for consistent high quality and finish (no paper required)
- No epoxy, curing or UV-light required
- Complies with the relevant TIA/EIA, IEC, CECC und EN/IS standards
- Durability: 500 cycles

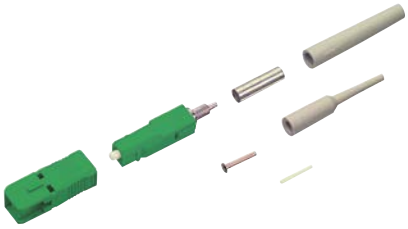
TECHNICAL DATA

- Ferrule: Ceramic
- Attenuation typical (dB): 0.3
- Temperature range: -10°C to +60°C

INSTRUCTION SHEET LIGHTCRIMP PLUS

LightCrimp Plus SC; English; Part Number: 408-4471

LightCrimp Plus SC Connectors



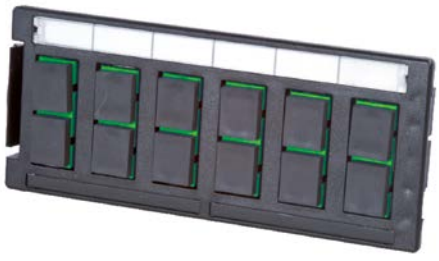
FEATURES

- SC connector (simplex)
- Ceramic ferrule
- With pre-installed and pre-polished fiber

ORDERING INFORMATION

Description	Part Number
Simplex SC OS2 APC; (250 µm + 900 µm only); Body: green; Boot: Blue; Packaging: 10	2064184-1
Simplex SC OS2 (250 µm + 900 µm + 3 mm jacketed cable); Body: blue; Boot: blue; Packaging: 10	6693276-1
Clips to connect two SC simplex connectors to one SC duplex connector (2 clips needed); green	6348522-2

Quick-Fit Fiber Modules



FEATURES

- Universal Modules with Quick-Fit footprint
- Fit in all TE CONNECTIVITY Patch Panels with Quick-Fit footprint
- Not interchangeable with push pin fixation

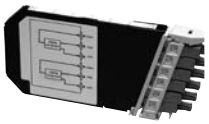
Color: black (RAL 9005)
Note: MT-RJ panel jacks NOT include

ORDERING INFORMATION

Description	Color	Part Number
6x SC/APC duplex; Fiber Type: OS2; Ferrule: Ceramic	Green	1671201-4
Blank module		1479698-1

Video-WDM (Wavelength Division Multiplexer)

When RF video is required for OLS applications, wave-length division multiplexers (WDMs) support combining the analog or digital video with the voice and data from the OLT. TE's WDM modules and rack mounted shelves offer a compact solution for OLS deployments.



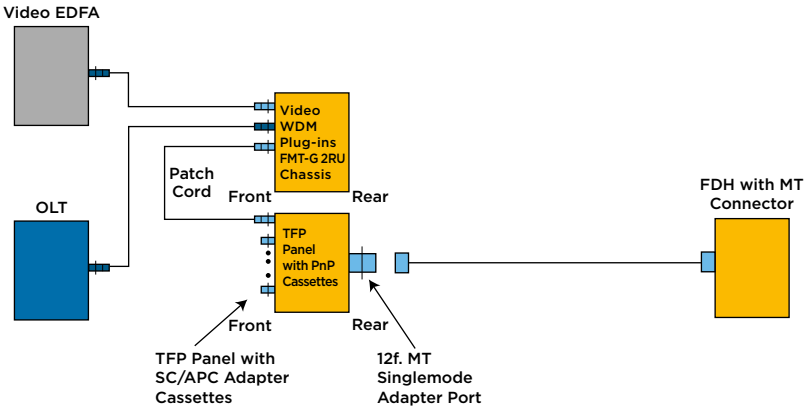
WDM Module

12-Position FMT Drawer
(FMT-GVM000000-A72P)

WDM FEATURES

- Integrated into traditional TE fiber management systems
- Qualified to GR-1209 and GR-1221
- Rugged package protects delicate splitters from installer handling or in harsh environments
- Industry-leading low loss
- Terminated with GR-326 certified connectors

VIDEO-WDM APPLICATION

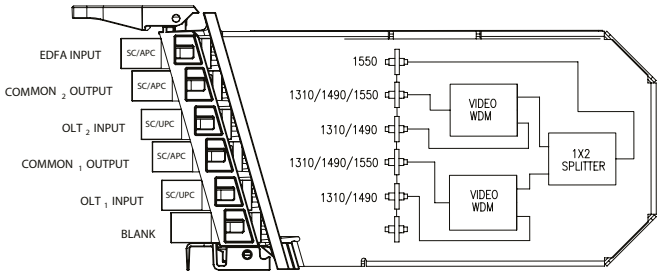


ORDERING INFORMATION

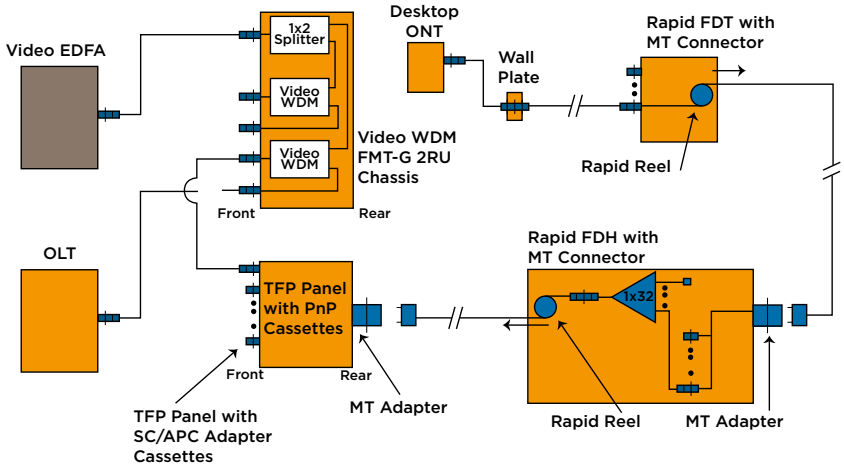
Description	Part Number
FMT MicroVAM Chassis 12-Position, accommodates up to 24 MicroVam modules. 2RU, 19/23" mounting, 12" deep	OMT-GVM000000-A72P
Dual MicroVAM Video-WDM Module 1310/1490 voice/data with 1550 video Dual circuit All front Input/output ports Input 1 (OLT) connectors SC/UPC Input 2 (EDFA) connectors SC/APC Output (common) connectors SC/APC Fits in FMT MicroVAM chassis listed above	OPM-HVJNJ02
Horizontal Glide Cable Manager 3RU with integrated slack storage spools	ODCCMHIBS-3U
Plug-and-play 2x32 WDM Splitter	OLS-MPP1E66

Dual MicroVAM Video-WDM with integrated 1x2 splitter

For certain video RF applications, an additional split before the video WDM may be desired. The MicroVAM unit pictured below offers a compact solution for adding additional splits of the video signals prior to being combined at the video WDM device. The MicroVAM unit fits into a FMT MicroVAM chassis.



DUAL MICROVAM VIDEO-WDM WITH INTEGRATED 1X2 SPLITTER APPLICATION



ORDERING INFORMATION

Description	Part Number
Dual Micro-VAM Video-WDM 1310/1490 voice/data with 1550 video Dual circuit 1550 EDFA input integrated with 1x2 splitter All front Input/output ports Input 1 (OLT) connectors SC/UPC Input 2 (EDFA) connectors SC/APC Common (output) connectors SC/APC Fits in FMT MicroVAM chassis listed below	OPM-HVJNJH02-VZB
FMT MicroVAM Chassis 12-Position, accommodates up to 12 MicroVam modules 2 RU, 19" or 23" mounting, 12" deep	OMT-GVM000000-A72P

The Blown Fibre system from TE Connectivity

The Blown Fibre system from TE Connectivity provides a simple solution to manage evolving network demands without the need for high initial capital expenditure or extensive network planning. Blown Fibre enables optical networks to adapt to changing business requirements.

The TE solution allows optical fibres to be deployed on demand from one point of a network to another (internal or external) using compressed air to blow optical fibre into pre-installed tubes.

Building your network using the TE Blown Fibre system could realise the following benefits:

SIMPLIFIED PLANNING

- Network is built according to today's needs
- Fibre count can be increased as demand grows

COST EFFECTIVE

- Pay as you grow – install empty tubes and only pay for fibre as and when required, spreading capital investment over time
- Reduced splicing – minimises branching and splicing of traditional networks, which reduces engineering costs
- Deployment of fibres is related to actual requirement
- Elimination of unlit fibre and the associated up front investment

INCREASED FLEXIBILITY

- Future proof network build
- Networks are easily upgraded, branched or extended, giving maximum flexibility and uninterrupted fibre blowing right to the destination
- Simplified emergency restoration
- Latest and emerging fibre technologies can be deployed

SPEED OF CUSTOMER CONNECTIONS

- Equivalent performance for first connections, significantly reduced timescales and costs for subsequent connections
- Existing tube routes can be interrupted at any place, allowing rapid network upgrades

Blown Fibre

SINGLEMODE – BLOWN FIBRE UNIT

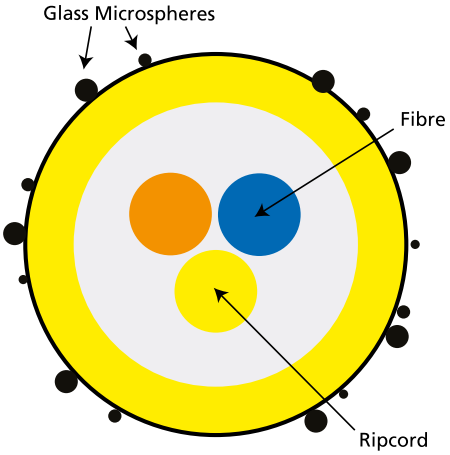
Singlemode Blown Fibre Units meet the OS2 industry standard as set out in ISO/IEC 11801:2002 and is compliant to ITU-T RECOMMENDATION G.652 C/D. Ideally suited for deployment in metro area, campus and building backbone environments, singlemode blown fibre allows for maximum network design flexibility.

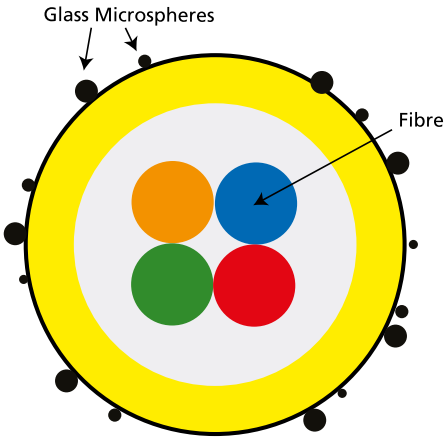
Each blown fibre unit has an external coating of glass microspheres which assist in blowing fibres over large distances.

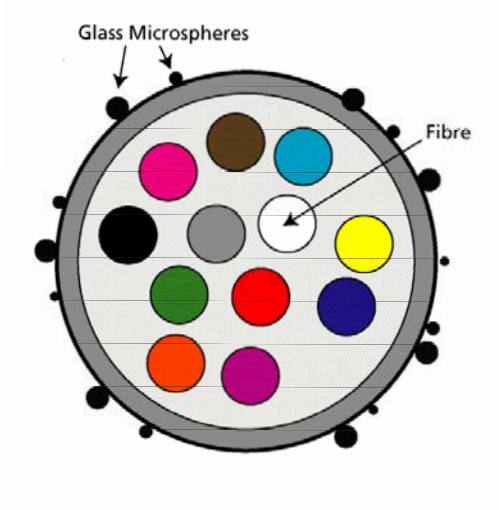
All Optical Fibre Units are specifically engineered for Blown Fibre applications. The small diameter units have surface modifications to facilitate installation with the Blowing Head. The units are approved by British Telecom to the Specification CW 1574.

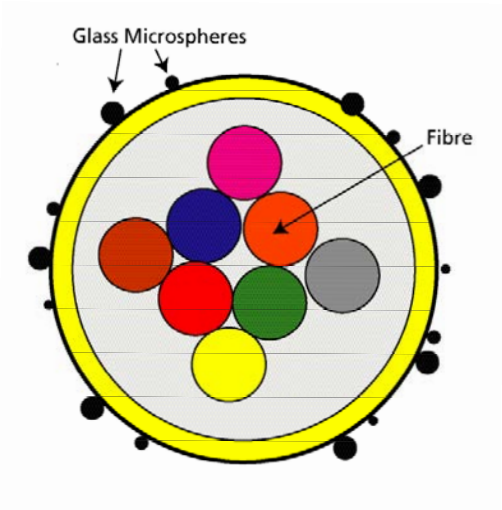
The Blown Fibre unit comes in the following variants:

- 2 fibre singlemode
- 4 fibre singlemode
- 8 fibre singlemode
-12 fibre singlemode







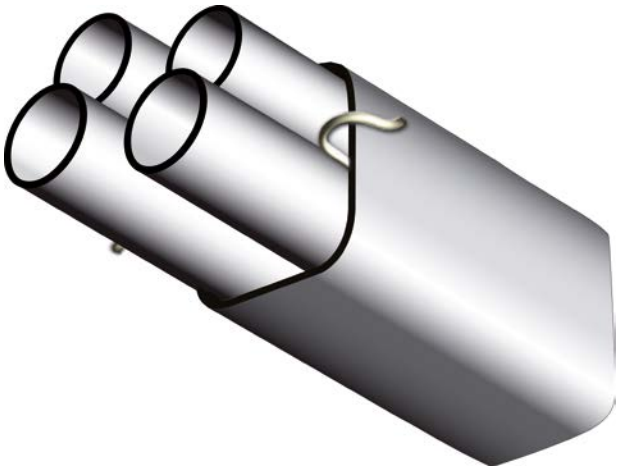


Blown Tube

BLOWN TUBE – INTERNAL

Small diameter low friction tubes provide the dedicated pathway for the optical fibre units are integral to the TE blown fibre solution. Empty High Density Polyethylene (HDPE) tubes are available in a variety of sizes, combinations, and protective systems. The tubes have all been rigorously tested and enable the blown fibre units to be blown the optimum distance within the tube network. A comprehensive range of jointing accessories is available for tube-to-tube connections, reducing, gas and water blocking.

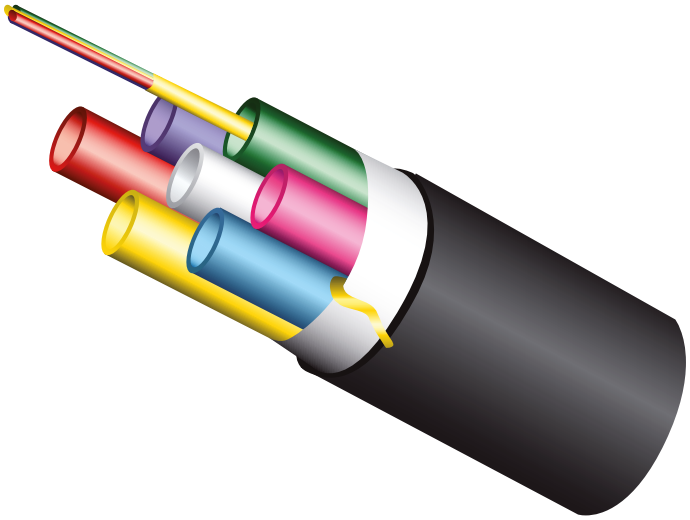
The indoor range of products is available in reduced fire hazard/Low Smoke Zero Halogen (LSZH) options.



BLOWN TUBE – EXTERNAL

The outdoor range of products is available in standard sub-duct, heavy duty, anti-rodent, or armoured versions.

The tubing products (for both internal and external applications) are available in 4, 7 and 12 way variants (other counts on request), each containing 5mm OD, 3.5mm ID sub-units in an outer sheath.



Optical LAN Solution

Internal Plant

GAS SEAL UNIT

The Blown Fibre Gas Seal Unit can be used at all customer entry points. A wall mounted unit, it is positioned internally at the cable entry point. Gas sealing connectors facilitate the transition of the incoming external blown fibre tubing to the internal blown fibre tubing. These connectors are used to seal both populated (with blown fibre bundle) and unpopulated blown tubing. The unit is used for internally fed cable or with a Customer Lead-In Unit for cables entering through the fabric of the wall.

CUSTOMER LEAD-IN UNIT

The Customer Lead In Unit enables external Blown Tube to be passed through the building fabric from an outside wall and can be used to enter any type of building whether office, factory or residential. The Customer Lead-In Unit comprises two separate units mounted either side of the wall and connected by a length of conduit. This product can also be used to manage the entry of conventional cable.

INTERNAL TUBE DISTRIBUTION UNIT

The Internal Tube Distribution Unit (Internal TDU) has been designed to allow maximum flexibility within building applications. The Internal TDU accepts a range of Indoor tube assemblies up to 19 tube capacity. The units allow individual tube breakout, re-routing or gas/water sealing. The tubes are positively managed to prevent excessive tube bending.

Installation Equipment

INSTALLATION EQUIPMENT

The installation process for the blown fibre units requires the use of additional equipment items in conjunction with the blowing head and compressor. This range of equipment includes the Regulator, Pan Guide, Pan Support Frame, Fibre Inversion Pan, Pan Inversion Ring, and Blowing Beads. The full range of equipment is available from TE. It is necessary for an installer to attend the Installation Training Course (booked through TE Connectivity UK) prior to using this equipment.

ACCESSORIES

An integral part of the TE Blown Fibre Solution is the tube connection and tube sealing products. A wide range of products is available which enable tubes to be connected together, sealed from water or gas ingress, or reduced from one tube size to another. This range of accessories is fully compatible with the Blown Fibre Units and Blown Fibre Tube supplied by TE.

PON System Guide Conclusion

PON is a point-to-multipoint network architecture in which unpowered optical splitters enable one strand of singlemode optical fiber to serve multiple users with data, video and voice services through a variety of Internet protocol (IP)-enabled devices, such as computers, wireless access points (WAPs) and voice over IP (VoIP) phones.

We have demonstrated how a PON fiber cable infrastructure can greatly help to reduce the amount of physical cable and associated costs when compared against a traditional copper structure cabling network. On a typical installation of 700 users it is possible to reduce the total weight of the cabling portion by more than 2.5 tons and deliver a cost saving of more than 25K dollars. Savings become even more significant when combined with the overall cost reduction of the active equipment and the associated annual running costs (OPEX) which from our previous calculation sums up to more than 54K Euro.

Finally, different system configurations based on innovative fiber design technology such as RapidReel™ can accommodate various network needs, architectures, buildings layout and economics. TE Connectivity offers the widest variety and highest quality of cabling solutions to deliver the most cost effective and streamlined Passive Optical Networks.

For more information and an accurate bespoke evaluation of the savings that PON can deliver to your IT network please contact a TE connectivity representative.

TE ENTERPRISE NETWORKS REGIONAL SALES HEADQUARTERS:

North America
Greensboro, NC, USA
Ph: +1-800-553-0938
Fx: +1-717-986-7406

Latin America
Buenos Aires, Argentina
Ph: +54-11-4733-2200
Fx: +54-11-4733-2282

EMEA
Kessel-Lo, Belgium
Ph: +32-16-35-1321
Fx: +32-16-35-2188

SAARC
Bangalore, India
Ph: +91-80-4011-5000
Fx: +91-80-4011-5030

Asia
Hong Kong, China
Ph: +852-2735-1628
Fx: +852-2735-1625

Pacific
Sydney, Australia
Ph: +61-2-8748-9500
Fx: +61-2-9748-8487

TE ENTERPRISE NETWORKS IN EUROPE, MIDDLE EAST AND NORTH AFRICA:

Austria
Vienna
Ph: +43-1-90560-1204
Fx: +43-1-90560-1270

Belarus
Minsk
Ph: +375-17-237-47-94
Fx: +375-17-237-47-94

Belgium
Kessel-Lo
Ph: +32-16-35-2326
Fx: +32-16-35-2353

Bulgaria
Sofia
Ph: +359-2-971-2152
Fx: +359-2-971-2153

Czech Rep. & Slovakia
Brno
Ph: +420-541-162-112
Fx: +420-541-162-223

Denmark
Glostrup
Ph: +45-70-15-52-00
Fx: +45-43-44-14-14

Egypt
Cairo
Ph: +20-2-2419-2334
Fx: +20-2-2417-7647

Finland
Helsinki
Ph: +358-95-12-34-20
Fx: +358-95-12-34-250

France
Cergy-Pontoise
Ph: +33-1-3420-2122
Fx: +33-1-3420-2268

Germany
Darmstadt
Ph: +49-6151-607-1547
Fx: +49-6151-607-1219

Hungary
Budapest
Ph: +36-1-289-1007
Fx: +36-1-289-1010

Italy
Collegno (Torino)
Ph: +39-011-4012-111
Fx: +39-011-4012-268

Kazakhstan
Almaty
Ph: +7-327-244-5875
Fx: +7-327-244-5877

Lithuania
Vilnius
Ph: +370-5-213-1402
Fx: +370-5-213-1403

Netherlands
Den Bosch
Ph: +31-73-6246-246
Fx: +31-73-6246-958

Norway
Nesbru
Ph: +47-99-66-77-50
Fx: +47-66-77-88-98

Poland
Warsaw
Ph: +48-22-4576-700
Fx: +48-22-4576-720

Portugal
Evora
Ph: +351-961-377-331
Fx: +351-211-454-506

Romania
Bucharest
Ph: +40-31-860-2113

Russia
Moscow
Ph: +7-495-790-7902
Fx: +7-495-721-1894

Spain
Montcada (Barcelona)
Ph: +34-93-291-0330
Fx: +34-93-291-0608

Sweden
Upplands Väsby
Ph: +46-8-5072-5000
Fx: +46-8-5072-5001

Switzerland
Steinach
Ph: +41-71-447-0-447
Fx: +41-71-447-0-423

Turkey
Istanbul
Ph: +90-212-339-92-00
Fx: +90-212-339-92-02

U.A.E.
Dubai
Ph: +971-4-3466511
Fx: +971-4-3466513

UK
Tewkesbury, Glos
Ph: +44-1684-857966
Fx: +44-1684-857988

Ukraine
Kiev
Ph: +380-44-206-2265
Fx: +380-44-206-2264

CATALOG

Contact us:
Please contact us at one of the regional offices shown above.

TE Enterprise Networks:
www.te.com/enterprise-eu

TE Connectivity:
www.te.com

AMP-TWIST, FLEX-MODE, RapidReel, RealFlex, TrueNet, TE Connectivity, TE connectivity (logo), Tyco Electronics, and TE (logo) are trademarks of the TE Connectivity Ltd. family of companies and its licensors.

While TE Connectivity has made every reasonable effort to ensure the accuracy of the information in this document, TE Connectivity does not guarantee that it is error-free, nor does TE Connectivity make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE Connectivity reserves the right to make any adjustments to the information contained herein at any time without notice. TE Connectivity expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this document are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE Connectivity for the latest dimensions and design specifications.

© 2014 TE Connectivity family of companies. All rights reserved.

109830EU 01/14 Revision